

**YUCAIPA VALLEY WATER DISTRICT
2000 URBAN WATER MANAGEMENT PLAN
AND
WATER SHORTAGE CONTINGENCY PLAN**

**SECTION 1
INTRODUCTION**

1.0 INTRODUCTION

This Urban Water Management Plan has been prepared by the Yucaipa Valley Water District in conformance with the California Urban Water Management Planning Act, California Water Code Division 6, Part 2.6 Urban Water Management Planning. This Plan is a revision and update of the District's 1990 Urban Water Management Plan. The plan was developed in coordination with revision of the District's Water and Wastewater Master Plan updates.

1.1 PUBLIC PARTICIPATION

This plan was developed during the summer and fall of 2000. A public workshop on the plan was held by the YVWD Board of Directors on November 16, 2000. A public hearing on the plan was held December 20, 2000 to review the plan with local agencies and to announce the availability to the general public. In addition to the above, individual meetings were held with major property developers and various local agencies. Notifications of the Plan development was also made directly to the following:

Public Agencies and Government

- City of Yucaipa
- City of Calimesa
- San Bernardino Valley Municipal Water District
- San Gorgonio Pass Water Agency
- California Regional Water Quality Control Board
- County of San Bernardino
- County of Riverside
- City of Beaumont Wastewater Authority
- Beaumont Cherry Valley Water District
- City of Redlands
- Yucaipa-Calimesa Joint Unified School District
- Riverside LAFCO
- San Bernardino LAFCO
- East Valley RCD

Private Water Purveyors

- Western Heights Water Company
- South Mesa Water Company

Environmental/Interest Groups

- San Timoteo Greenway Conservancy
- Oak Glen Community Services Organization

Media

- Yucaipa & Calimesa News Mirror
- Press Enterprise
- The San Bernardino Sun

Notification of the Plan development also appeared on the YVWD website.

1.2 SUPPLIER SERVICE AREA CHARACTERISTICS

The Yucaipa Valley Water District provides water, wastewater and recycled water services to customers in the Cities of Calimesa and Yucaipa, and portions of Riverside and San Bernardino County (see figure 1-1). The District was formed in 1971, acquiring many of the private water companies serving the Yucaipa Valley. The District has continued to consolidate water services in the region, acquiring the Harry V. Slack Water Company in 1987 and the Wildwood Canyon Mutual Water Company in 1992.

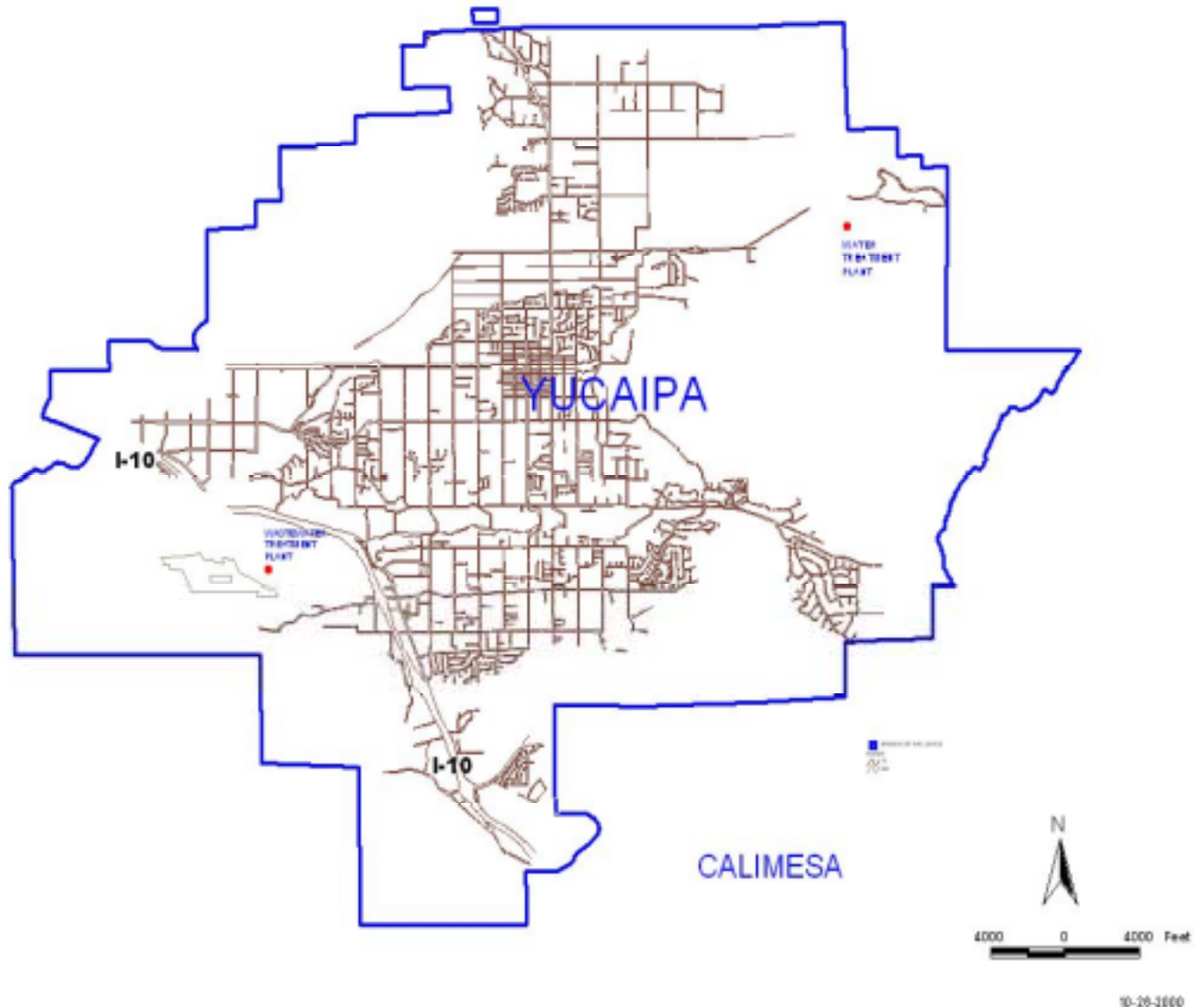
Water was developed in the region to serve a predominantly agricultural base of orchard crops. Recently agriculture is giving way to urban and suburban development and demands are growing apace with population increases. In order to determine the rate and amount of growth in the community, the District relies on the development approval processes of the City of Yucaipa, the City of Calimesa, the County of San Bernardino, and the County of Riverside. The District utilizes the planning projections of these agencies together with the demands of the current residents and businesses to ensure a safe and reliable water supply is maintained

The Yucaipa Valley is bounded by the San Bernardino National Forest to the north and east, low lying hills to the south and the Crafton Hills to the northwest. The District serves elevations ranging from 600 feet above sea level to about 3,300 feet above sea level. The City of Yucaipa lies in the middle of this range at about 1640 feet.

The climate of the region is a Mediterranean type with dry, warm summers and cool wet winters, with significant precipitation variation year to year. The average annual temperature for Redlands, California near Yucaipa but lying a lower elevation, is 78 degrees (F). The average July maximum is 94.5 degrees and the average minimum is 60.5 degrees. The average January maximum is 64.7 degrees and minimum is 39.3 degrees. Average total precipitation is 13.5 inches with 86% of precipitation occurring December through April. Daytime temperatures in the portions of the Yucaipa Valley served by the District will average 2-7 degrees cooler than Redlands due to elevation differences.

Precipitation is also greater towards the mountains above the Yucaipa Valley due to the effect of orographic lift.

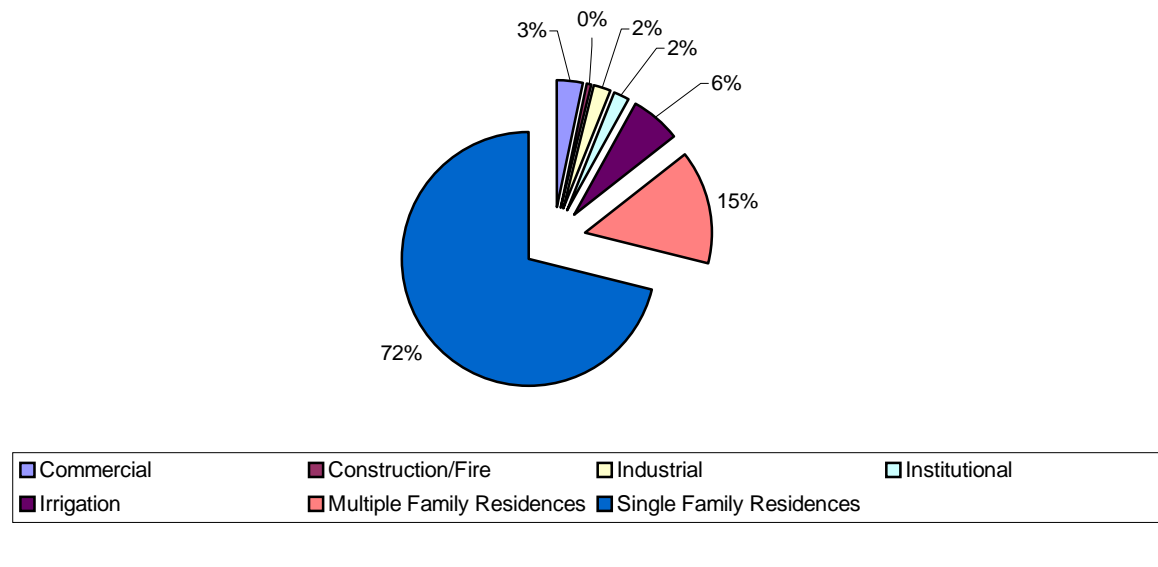
FIGURE 1-1: YUCAIPA VALLEY WATER DISTRICT



Current and Future Water Use

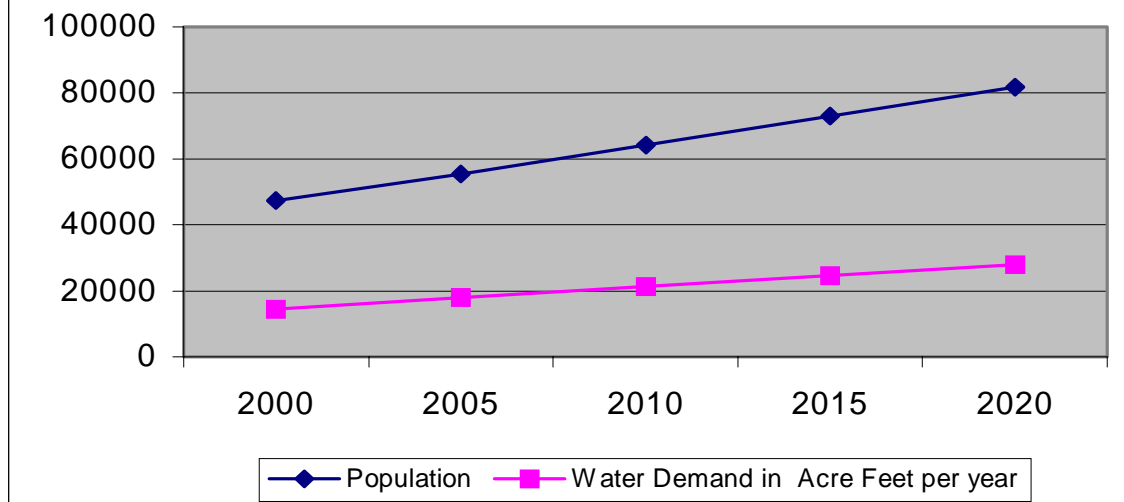
Current water demand within the District is about 9,500 acre-feet per year. Including areas served by the Western Heights Water Company and the South Mesa Water Company, the demand total grows to about 14,500 acre feet per year. Water use within the district only is predominantly single family residential as show in figure 1-2, accounting for about 8,600 acre feet or 72 percent of water used.

Figure 1-2 Water Use by Sector 1997-2000



Based upon projected population growth estimates from the State Department of Finance, the Planning Departments of the cities of Yucaipa and Calimesa in addition to data from the Oak Valley Environmental Impact Report, the District's population is expected to grow to about 81,800 persons in 2020. Based upon an average per capita demand of 275 gallons per day, total demands in 2020 are expected to grow to about 27,880 acre feet per year, as shown in figure 1-3.

**Figure 1-3 Yucapa Valley Regional Water Demands
(including WHWC, SMWC and Oak Valley)**



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**SECTION 2
WATER SOURCES AND RELIABILITY**

2.1 GROUNDWATER

The Yucaipa Valley Water District has traditionally met the bulk of service area customer needs from groundwater through the District's thirty-one primary water wells. Two additional wells were under construction in 2000 replacing capacity from wells with degraded production. Most of these wells pump from the Yucaipa groundwater basin, with less than 1,000 acre-feet being pumped from the Beaumont basin. Demand has grown in the last two decades to where the District alone is now pumping at about the calculated safe yield of the Yucaipa basin, just over 9,000 acre-feet per year. Coupled with pumping by the Western Heights Municipal Water Company and South Mesa Water Company of about 2,400 acre-feet per year for each Company and the basin is technically in an overdraft situation, though water levels are currently at or near historic highs.

The Yucaipa groundwater basin is subdivided into seven sub basins as follows:

- Mill Creek
- Gateway
- Crafton
- Oak Glen
- Calimesa
- Wilson Creek
- San Timoteo

The Wilson Creek and Calimesa sub basins are the largest and most important of these sub basins. Total capacity of the basin is estimated at 807,517 acre-feet (Fox, 1990). Groundwater is typically reached within 200-280' below the land surface. If pumping were to reduce groundwater levels to an average depth of 400', an additional 300,000 acre-feet of water would be available. These sub basins historically have declined during dry cycles and risen during wet ones. No subsidence due to water pumping has been noted. Minor amounts of groundwater recharge (less than 1000 af/yr) through surface water spreading have occurred in the Wilson spreading grounds, an area of four spreading basins located within the District along Wilson Creek.

Significant potential exists to increase spreading of water in the Wilson creek spreading grounds and utilization of the Oak Glenn Creek stream channel for additional recharge. By maximizing the existing spreading grounds and expanding spreading acreage along Oak Glen Creek (25-50 acres), the capability

exists to spread from 7,000 to 14,000 acre feet of surface water annually into the Yucaipa basin.

The YVWD is currently involved with development of a groundwater management plan (AB 3030 plan) to proscribe collective management of the basin. With ample storage, ability to recharge the basin by spreading surface waters and apparent flexibility in managing groundwater levels without subsidence problems, the Yucaipa basin could be conjunctively managed both to meet normal annual demands and to meet water resource needs in the event of a drought and curtailment or loss of inconsistent surface water supplies, resulting in a highly reliable water supply. Current goals are to secure agreements to not pump beyond the safe yield of the basin, supplementing supplies with imported surface or groundwaters.

The YVWD will also be able to receive water from the San Bernardino Basin via the East Branch extension of the State Water Project pipeline. This water would be served as part of a conjunctive management scheme for the basin coordinated with the San Bernardino Valley Municipal Water District, the regional wholesaler of SWP water in San Bernardino County. A portion of the San Bernardino Basin known as the Bunker Hill Pressure Zone, has encountered problems from high groundwater tables occurring mainly after a series of wet years. This high groundwater creates direct impacts in portions of the pressure zone, flooding basements and underground garages, and creates a high liquefaction potential for areas overlying the Zone in the event of an earthquake. Conjunctive management of this Zone along with other portions of the Basin can lower unacceptably high groundwater and allow for recharge in areas upgradient from the Pressure Zone such as the Lytle Creek subbasin.

In October of 2000, the District entered into a Memorandum of Understanding with the California Department of Water Resources, the San Geronio Pass Water Agency, the City of Beaumont, the City of Banning, the Beaumont-Cherry Valley Water District and the South Mesa Water Company to work cooperatively on formulating a conjunctive water management program to enhance the dependable yield of the San Geronio Pass Area Basins.

2.2 SURFACE SUPPLIES

Surface water supplies currently and prospectively available to the District are all considered inconsistent in that the available amounts will vary year to year based upon hydrology and other demands on these resources.

2.2.1 Local Surface Water Sources

The YVWD has traditionally received about 1,000 acre feet of surface water supplies from the Wildwood Canyon and Oak Glen watersheds. Production from these sources has recently been declining to less than 500 acre-feet annually.

These sources are both minor and relatively unreliable due to their greater availability only in wet periods.

2.2.2 Mill Creek Supplies

Though the Santa Ana – Mill Creek Cooperative Water Project Agreement YVWD is able to exchange up to 32 cfs of State Water Project water for Mill Creek water when available. This water can be delivered by gravity to the Wilson Creek spreading grounds and when the District's water treatment plant is built, this water can serve direct delivery needs. The SWP exchange water is delivered to the City of Redlands Hinckley or Tate water treatment plants. This source is highly variable, however, depending upon local hydrology. Flows in the creek can range from 10,000-120,000 acre-feet per year with the bulk of high water flows in the winter months. This is the least expensive supplemental surface water supply for the District. However, lack of storage limits the ability to exchange this water often available in wet years, for water during dry years.

2.2.3 Santa Ana River Supplies

In addition to the Mill Creek supplies, the District will be able to receive exchange water from Santa Ana River water rights holders once the water filtration plant is completed in 2004 and connected to the East Branch Extension pipeline to be completed in 2002. Phase II of the extension project will expand transmission capacity to the Yucaipa area to 88 cfs, with 48 cfs of capacity rights held by San Gorgonio Pass Water Agency and 40 by the San Bernardino Valley Municipal Water District. Santa Ana River water availability to Yucaipa would be subject to availability and exchange of SWP water.

2.2.4 Seven Oaks Dam Supplies

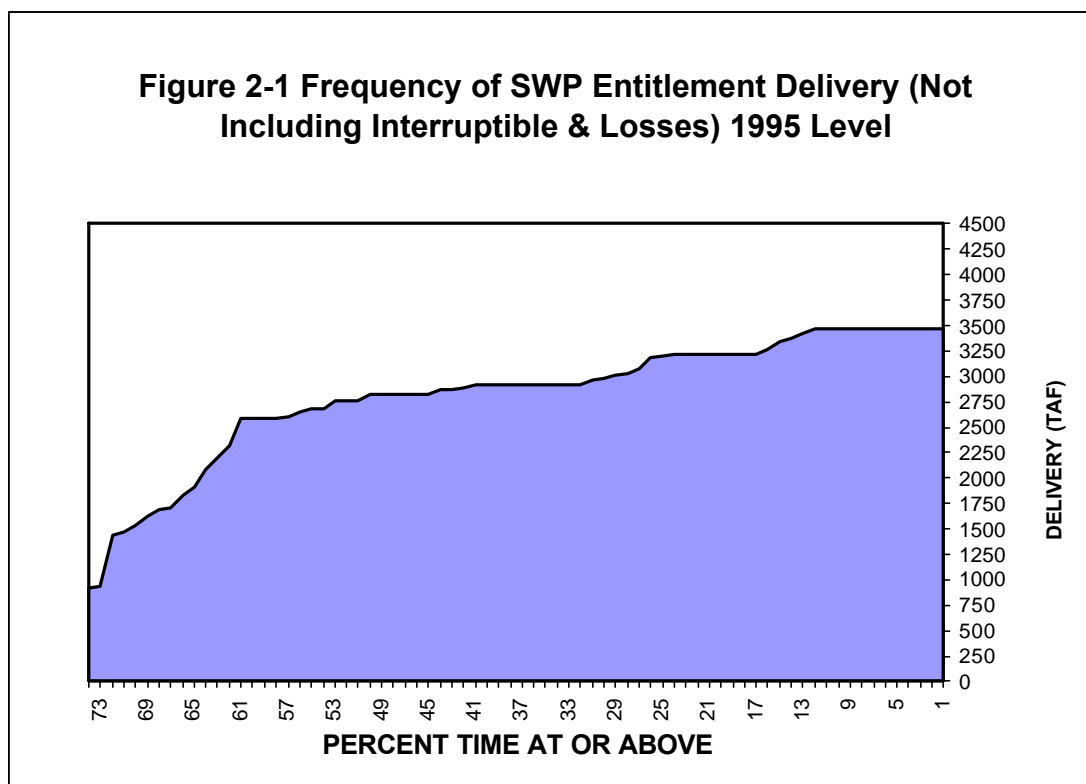
The recently completed Seven Oaks Dam operated by the U.S. Army Corps of Engineers will operate with a conservation pool of between 10,000 and 50,000 acre feet. The precise amount is the subject of ongoing negotiations. When the East Branch extension pipeline and water filtration plant is in service in 2004, Seven Oaks water could be delivered to Yucaipa for direct delivery to consumers. The long term average yield for the 50,000 acre-foot conservation pool is about 11,700 acre-feet annually. Flow from this conservation pool would be available generally from late spring through early fall, after the prime flood control obligations of the facility have ended each year.

2.2.5 State Project Water

The San Bernardino Valley Municipal Water District encompasses much of the YVWD and holds an entitlement to SWP water in the amount of 102,600 acre-feet annually. The San Gorgonio Pass Water Agency serves the remainder of YVWD through its SWP entitlement of 17,300 per year. SWP water will be

available directly or by exchange when the East Branch extension pipeline is completed in 2002. This water would only be available for groundwater recharge until a water filtration plant is on line in 2004

SWP reliability has been negatively affected due to the State's inability to complete the project as contracted. Despite efforts, it is likely that the full 4.2 million acre-feet design delivery capacity will never be reached due to environmental limitations. Currently the maximum delivery capability for the project is somewhat less than 3.5 million acre feet. In most years this amount cannot be delivered due to infrastructure limitations and environmental restrictions. **Figure 2-1** depicts the current supply reliability frequency for the project recognizing current curtailment requirements under State Water Resources Control Board Order 95-6 related to San Francisco Bay-Delta outflow requirements and SWP Delta pumping operations, in addition to fishery flow requirements as a result of the Central Valley Project Improvement Act Anadromous Fisheries Restoration Plan. As can be seen from the figure, full entitlement demands on the project could be met only about 10% or less of the time, with 25% or higher shortages occurring more than 40% of the time based upon historical hydrology.

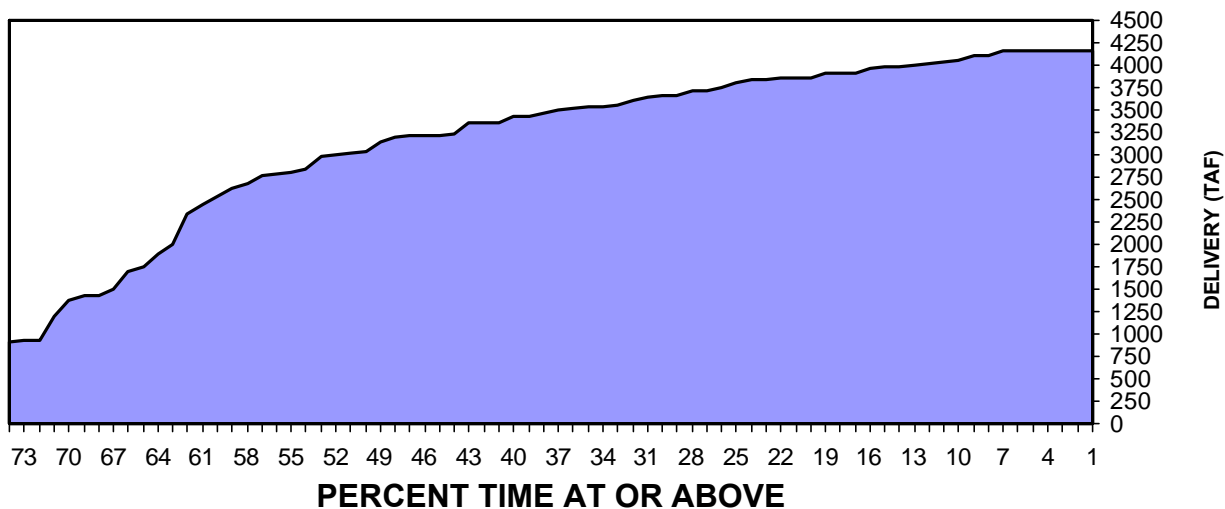


By 2020, with current fishery restrictions, the State assumes it will have added capacity in the system that will meet full entitlement demands only less than 10%

of the time. As shown by **Figure 2-2** in half the years, shortages of up to 25% will occur. In about one in three years, shortages will be 50% of demands or more. It should be recognized however, that demands are not the same as entitlements. In 1995 for example, deliveries to SWP contractors were just over 2 million acre feet or only about 58% of entitlements. It not be before 2020 when actual demands in most years exceed entitlements.

Actual shortages will be a function of actual versus entitlement demands and changes in outflow and fishery requirements. These demands will become closer as time goes on as agency demands served by the SWP grow into their full entitlements. In sum, the above reveals that the SWP is incapable of reliably meeting the full entitlement demands and it will become an increasingly unreliable water source for meeting a high percentage of an agency's ongoing annual water needs as demands on the system grow.

Figure 2-2 Frequency of SWP Delivery (Not Including Interruptible & Losses) 2020 Demand Level



2.3 RECYCLED WATER

The District has been planning for development of recycled water throughout the 1990's. Recycled water meeting Title 22 requirements is available through the Wochholz water treatment plant and dual plumbing is currently being installed in new developments. Recycled water is being delivered to three customers and

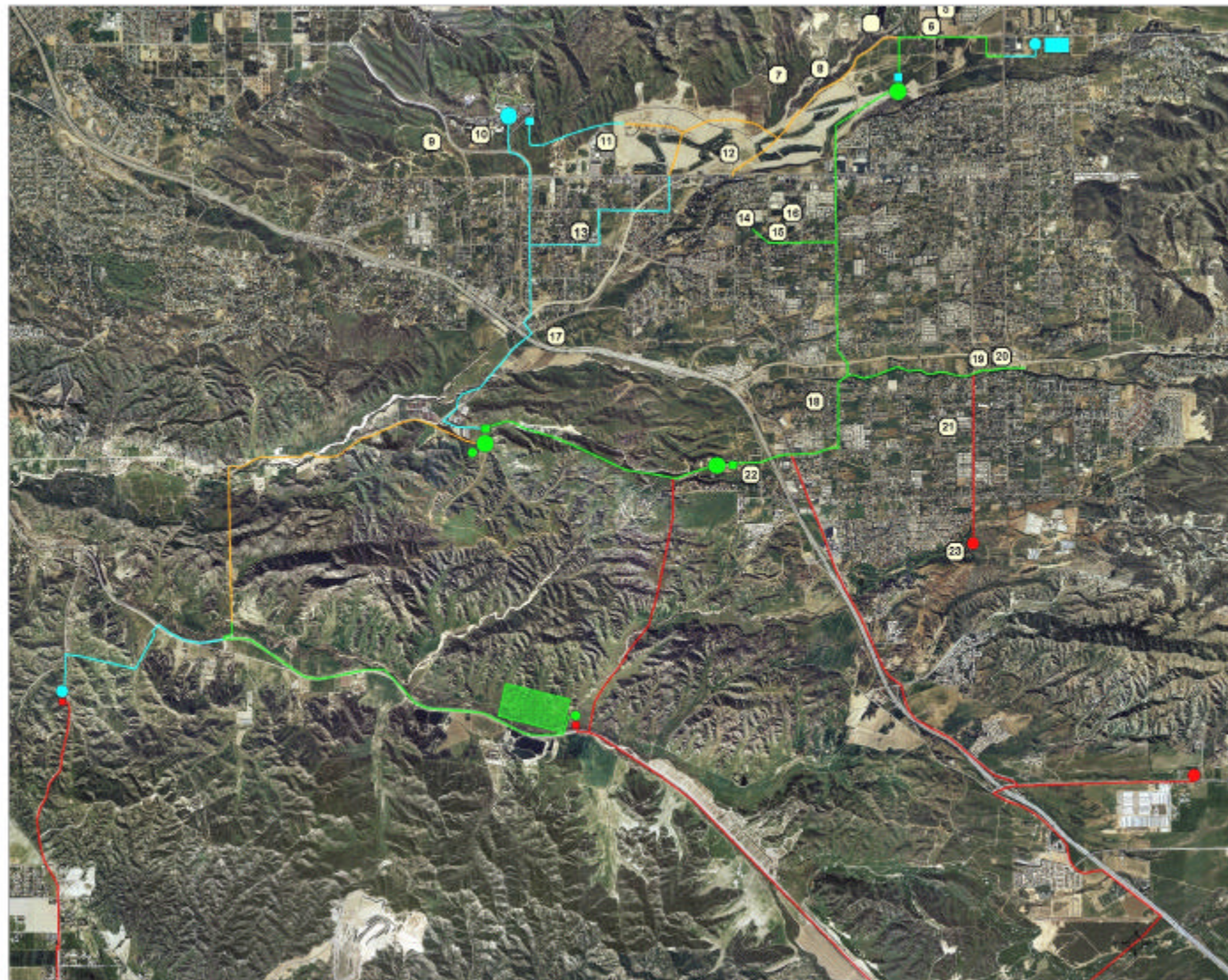
will be expanding in 2001. Delivery amounts are expected to grow to about 6,700 acre-feet by 2020, or about 24% of total agency water demands.

The District's Recycled Water Master Plan is currently being revised for consideration in 2001. This process is currently revising recycled water demands and developing a revised phasing program optimizing the development of recycled water transmission and delivery systems. General system development can be seen in **Figure 2-3**. Current and projected wastewater flow and projected recycled water appears in **Table 2-1**. With expanded residential and recreational development in the District, significant opportunities for utilization of recycled water are being capitalized upon. Revised recycled water use estimates derived from the master plan update will be incorporated in the 2005 UWMP revision.

Table 2-1 Annual Wastewater Flow (mgd)		
<u>Source</u>	2000	2020
Yucaipa	3.5	5.1
Calimesa	0.7	0.8
Oak Valley	--	2.0
Total	4.2	7.9
Total Annual WW Available (Acre-feet)	4,700	8,850
Projected Recycled Water Use Annually (Acre-Feet)	--	6,700

2.4 WATER SUPPLY RELIABILITY STRATEGY

Despite rapidly growing demands on the YVWD, ample opportunities exist to provide a reliable supply for the community through to its ultimate buildout. In the near term, the District will stabilize its demands on the groundwater basins, continue developing recycled water and utilize surface waters for direct delivery to customers beginning in 2004 to meet increased demands. Surface supply availability from the State Water Project, San Bernardino Basin Bunker Hill Pressure Zone, Seven Oaks Dam, Mill Creek and Santa Ana River can be used interchangeably depending upon local and statewide hydrology to supplement a stable local groundwater yield. Additionally, the District will incorporate recycled water delivery systems into new development, focusing service of new irrigation demands on recycled water. Recycled water will give the District a new local



YUCAIPA VALLEY WATER DISTRICT

FIGURE 2-3

Recycled Water Master Plan Facilities

LEGEND

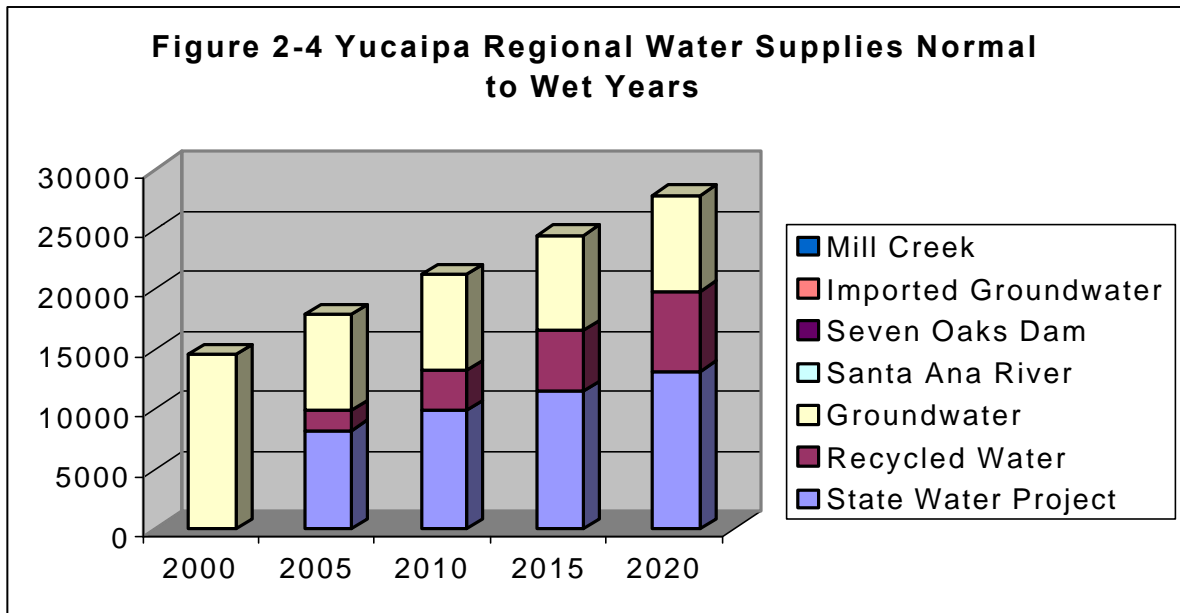
- Existing Facilities
- Phase I Facilities
- Phase II Facilities
- Future Facilities

- 1 Wetlands Project
- 2 Yucaipa Regional Park
- 3 Park View Middle School
- 4 Ridgeview Elem. School
- 5 Bryant Glen Sports Complex
- 6 Yucaipa Community Park
- 7 Chapman School Site 1
- 8 Chapman School Site 2
- 9 Hampton Hts. Golf Course
- 10 Crafton Hills College
- 11 Yucaipa High School
- 12 YVA Golf Course
- 13 Dunlap Elementary School
- 14 Valley Elementary School
- 15 Seventh Street Park
- 16 Yucaipa Junior High School
- 17 Caltrans Freeway Beaut.
- 18 Calimesa Park
- 19 Soccer Complex
- 20 Equestrian Center
- 21 Calimesa Elem. School
- 22 Creekside Park
- 23 Calimesa Golf Course

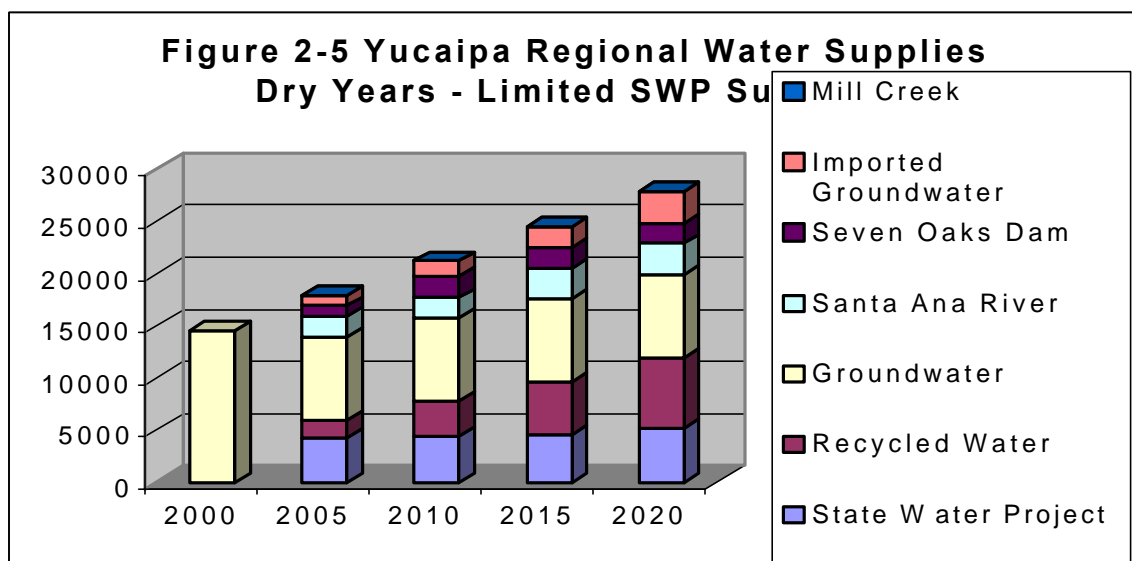
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source of water of high reliability, both lessening the dependence on imported sources and increasing reliability of the District's total supply.

Figure 2-4 depicts how demands will be met under typical conditions when ample SWP water is available.



In many dry years full entitlement deliveries of SWP water may not be available. In such times the District will have to rely more heavily upon other imported sources. **Figure 2-5** depicts one scenario of supplies that could meet demands out to 2020 in such year types.



In some extremely dry years no SWP water may be available or YVWD may be asked to forgo SWP supplies to allow others who do not have access to other options to use available SWP supplies. **Figure 2-6** depicts one possible scenario where YVWD could, for a number of years, meet its needs without SWP water. In this scenario it is assumed that other imported regional surface water sources such as Mill Creek and Seven Oaks dam water are also unavailable. The local groundwater basin could be temporarily over-drafted in such a scenario to accommodate these losses. In subsequent years when wetter conditions prevail, additional SWP water could be delivered and local groundwater production could be reduced to allow for in-lieu groundwater recharge (see also description of three-year water supply in Section 4.0).

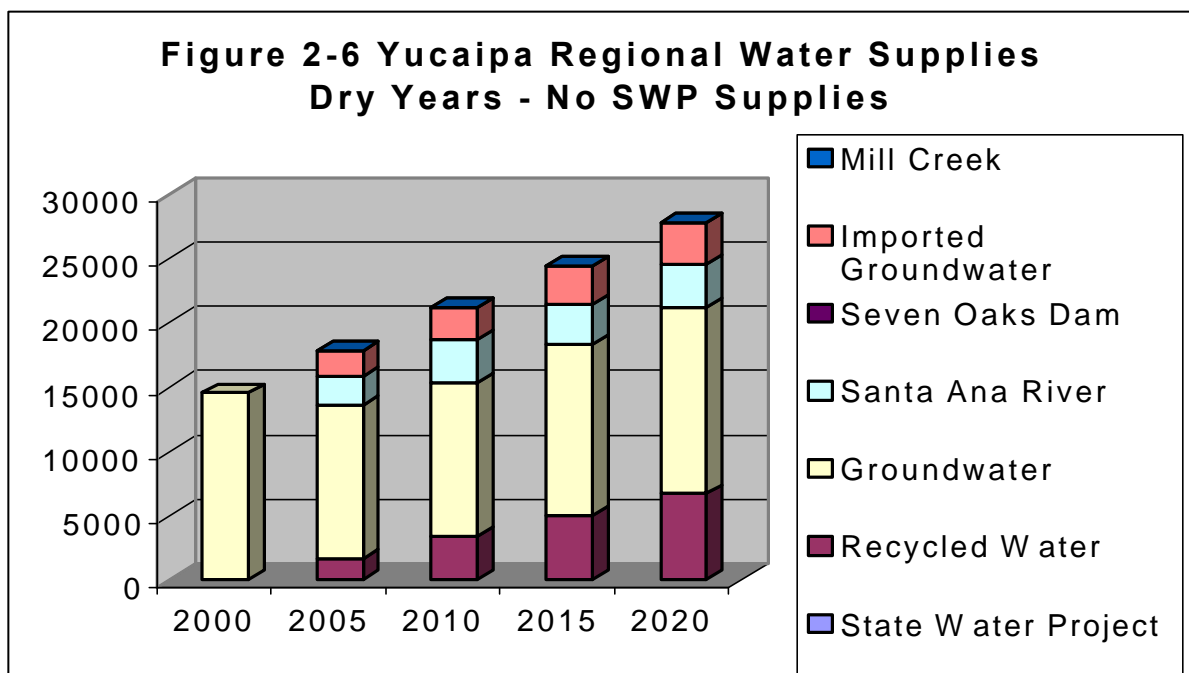


Table 2-2 depicts a range of expected water supplies that could be made available by 2020 and how their availability could be affected by hydrology.

Table 2-2 Range of Supply Options 2020 Supply and Demand (amounts in acre-feet/year; demand = 27,880 acre feet)			
Water Source	Normal to Wet Years	Dry Years – Limited SWP Water	Dry Years – No SWP Water
Groundwater	8,000	9,000-15,000	9,000-15,000
Recycled Water	6,700	6,700	6,700
State Water Project	16,000-17,000	5,000-7,000	0
Santa Ana River	0	2,000-5,000	2,000-6,000
Seven Oaks Dam	0	0-3,000	0
Imported Groundwater	0	3,000-6,000	3,000-7,000
Mill Creek	0	0-3,000	0

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**SECTION 3
DEMAND MANAGEMENT MEASURES**

3.0 INTRODUCTION

Demand management refers to methods a water supplier may undertake to reduce demand on the water system. The Urban Water Management Planning Act requires a description of sixteen specified demand management measures. For those measures not being currently implemented or planned for implementation, an evaluation of those measures and a comparison against expanded or additional water supplies must be made. Preference in the Act is given to those measures offering lower incremental costs than expanded or additional supplies. The Act also requires that economic and noneconomic factors including environmental, social, health, customer impact and technological factors be considered in the evaluation, however no specific guidance on evaluation methodology is given. Additionally, the description of measures in the act is brief, leaving much definition of both conservation devices and activities to be employed in many of the demand management measures to the analyst. A summary of measures recommended for implementation appears in **Table 3-1**.

3.1 DEMAND MANAGEMENT MEASURES UNDER IMPLEMENTATION

The District is implementing a public information program that includes information on interior and landscape water conservation and maintenance of a xeriscape demonstration garden. The District also implements metering and commodity rates for its water services with a tiered or inclining block rate structure with five tiers or blocks. Sewer rates are flat rates for residential service. Commercial and industrial service is a flat rate based upon an equivalent service unit. The District has adopted a water waste prohibition ordinance.

State law requires land use planning jurisdictions to enact a landscape water conservation ordinance consistent with the State Model Landscape Ordinance, or one that uses a water budget approach or one that has rules and regulations without tracking usage. Four land use jurisdictions operate within the District: San Bernardino County, Riverside County and the Cities of Calimesa and Yucaipa. Each have landscape ordinances complying with state law. The District does not independently review development plans for compliance with such ordinances as it does not have the legal authority to do so.

3.2 EVALUATION OF DEMAND MANAGEMENT MEASURES NOT CURRENTLY BEING IMPLEMENTED

The Urban Water Management Planning Act under California Water Code Section 10631 (g) requires an evaluation of water demand management measures specified in the Act which are not currently being implemented or scheduled for implementation. As noted above, preference is given to implementing measures that offer lower incremental costs than expanded or additional water supplies. The evaluation must do all of the following:

**Table 3-1
Summary of Recommended Demand Management Actions**

Conservation Measure	Currently Implemented	Recommended	Reason For Recommendation	Begin Implementing Date
Interior and Exterior Audits	No	Yes	Cost effective	'03
Plumbing Fixture Retrofits	No	Yes	Cost effective	'03
Distribution System Audits	Yes	Yes	Continuing program	N/A
Metering with Commodity Rates	Yes	Yes	Continuing program	N/A
Large Landscape Audits	No	Yes*	Pilot program initially recommended; potentially effective	'01
Landscape Conservation Requirements	Yes	Yes	Continuing program	N/A
Public Information	Yes	Yes	Continuing program	N/A
School Education	No	Yes	Inexpensive and complements other savings programs	'02
Commercial Industrial Conservation	No	No	Few such uses in District	N/A
New Commercial Industrial Review	No	No	'92 plumbing code already produces savings	N/A
Conservation Pricing	Yes	Yes	Continuing program	N/A
Landscape Conservation - Single Family Homes	Yes	Yes	Cost effective	'01
Water Waste Prohibition	Yes	Yes	Continuing ordinance	N/A
Water Conservation Coordinator	No	Yes	Required for overall implementation	'03
Financial Incentives	No	Yes**	As part of other actions	Varies
Ultra Low Flow Toilets	No	No	Not cost effective	N/A

* Pre Screening Survey Recommended Prior to Pilot Program

** Included in Individual Programs

- 1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact and technological factors
- 2) Include a cost benefit analysis, identifying total benefits and costs
- 3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost

- 4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation
- 5) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation
- 6) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation

3.2.1 Evaluation Methodology

While Water Code Section 10631 (g) specifies elements of the evaluation methodology, considerable room for professional judgement on how to address each element remains with the analyst. This section describes the general approach used herein.

- Accounting for economic and noneconomic factors including environmental, social, health, customer impact and technological factors. To some degree, these factors can all be reduced to dollar impact values and indeed some are imbedded in the cost/benefit factors which will be used in the cost benefit analysis. Where such factors cannot be incorporated in the cost/benefit analysis or significant implementation issues exist with respect to these factors, a qualitative evaluation will be made.
- Cost Benefit Analysis. Cost benefit analysis is generally understood to be a quantitative analysis analyzing the total benefits of an action less the total costs of the action, accounting for the present value of money. Where the net present value is positive, an action is said to make sense economically. With respect to conservation programs in general, this area is controversial and easily subject to manipulation of outcome based upon the assessments of costs and benefits and in particular, reduction of non-monetary benefits to monetary terms. In the conservation arena, reliable estimates of costs and savings vary by the activities. Local implementation issues such as particular land use make-up, age of structures, demographics, and implementation costs make translation of verified program costs and benefits from one location to another for analysis purposes prone to error. This analysis will utilize the most recent published data where available and appropriate. It must be recognized that many of the demand management measures, such as public information programs cannot of themselves be analyzed for water savings. However, such programs can help to market conservation measures such as plumbing retrofit programs, increasing their effectiveness. Additionally, depending upon measure design, there can be overlap between the demand management measures. For instance, a general residential water audit program can overlap with a single-family landscape water audit program.

The following benefits and costs will be quantified and considered utilizing DWR's Cost Effectiveness Tool, Version 1.1, a model created to provide some uniformity in analyzing costs and benefits of conservation programs within the context of Urban Water Management Plans. The analysis will be made from the perspective of the Yucaipa Valley Water District. This model provides that if a measure's net present value (NPV) is positive then the tactic should be implemented.

The following benefits will be assessed in the cost/benefit analysis.

- *Costs avoided by the water supplier of constructing production, transport, storage distribution capacity and wastewater treatment facilities, if any.*
- *Operating cost avoided by the water supplier, including but not limited to, energy and labor associated with the treatment of water deliveries and wastewater that no longer must be made.*
- *Avoided costs of water purchases by the water supplier.*

The costs above collectively determine the marginal cost of an additional increment of water supply. From the perspective of the water agency, the next cheapest increment of supply would simply be purchases of additional State Project Water from either the San Geronio Pass Water Agency or the San Bernardino Valley Water District for treatment and distribution. No additional facilities that could otherwise be avoided will be necessary within the District to accommodate these new demands. Operational and water cost savings would occur, however. These avoided costs are as follows: \$132/AF imported raw water cost savings, avoided water treatment, \$80/AF, avoided energy (pumping) \$20/AF, and avoided wastewater treatment of \$20/AF for a total avoided cost of \$252/AF.

It is generally recognized that the SWP cannot meet its contractual commitments in dryer years and that incremental improvements under the CALFED Bay-Delta program are being made to increase the marginal supply capacity and reliability of the project. CALFED has estimated the costs of a variety of demand management and supply augmentation actions for the project. The least expensive of the augmentation options include modifications to the South Delta facilities allowing the project pumps to utilize their current maximum capacity of 10,300 cfs and additional storage. The lower range of these costs to the end user are about \$800 per acre foot. However, given the cost structure for the SWP, any additional supplies and their costs would be blended into the current rate structure, i.e., the new higher cost supplies would be averaged in with the current supply costs. If the cost effectiveness example were being taken from the state or societal perspective, it might be appropriate to use these projects as the marginal supply cost. However from the District's perspective, such incremental rates do not apply.

Environmental costs and benefits will not be quantified as there is no generally approved methodology for this.

The following costs are assessed in the cost benefit analysis.

- *Capital expenditures incurred by the water supplier for equipment or conservation devices*
 - *Financial incentives to other water suppliers or retail customers*
 - *Operating expenses for staff or contractors to plan, design or implement the program*
-
- Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost. Additional purchases of water from the SWP function as the marginal supply to the District. Costs of these purchases are passed through to the ratepayer as water is sold.
 - Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation. The District has the legal authority to implement and recover cost for all of the recommended measures. Where programs are pursued and there are joint agency beneficiaries, contributions will be sought in proportion to the costs avoided and benefits received.
 - Existing Conservation Savings. The District's active demand management programs include public information, target replacement of leaking delivery lines and faulty meters, public information and landscape design review for new development. However, no empirical estimate is available for the effect of this existing conservation effort and its effect on the District's ability to further reduce demand. However, it is recognized that much passive conservation is occurring due to public information efforts, the development of a changed water ethic due to the 1987-1992 drought, and in particular plumbing code amendments which eliminate high-flow showerheads, faucets and toilets for new installations or replacement. It is estimated that such passive conservation has lowered demands which otherwise would have occurred by about 10% (DWR Bulletin 160-98). Additionally, generally less conservation potential exists in rapidly growing regions such as served by the District as the housing stock tends to be newer, incorporating low water use appliances. This new stock however, does provide an ongoing opportunity for outdoor savings as such new stock invariably incorporates automatic irrigation systems that must be monitored for maximum efficiency.

3.3 PROGRAMS EVALUATED

1. Interior and exterior water audits and incentive programs for single family residential, multifamily residential, governmental, and institutional customers.

Program Description: These programs generally involve sending a qualified water auditor to customer locations to audit water use. Interior water using fixtures are assessed and where leaking or high-flow devices are noted, the customer is informed. Exterior audits of irrigation systems are often included, from simple audits looking for leaks and broken sprinklers, checks of the system times and development of irrigation schedules, to irrigation uniformity audits. Programs can include provision of low flow showerheads, toilet flappers and toilet displacement devices.

Evaluation of Economic and Noneconomic Factors: Surveys of this type have become common among agencies with demand management programs. However, research on their cost-effectiveness has shown that the long term savings from these programs is much less than originally anticipated. That is, savings achieved through these measures decay over time due to equipment failure, failure of the customer to consistently follow recommendations and customer turnover. Savings decay rates average about 15% per year. Single family surveys can be expected to initially save 15 gpd per survey and multi family about 6.5gpd. Direct survey costs are estimated \$125 and \$330 per survey, respectively with a multi-family survey covering an average of 10 units per survey (\$33/unit) (CUWA, 2000). Agencies generally target high use accounts for surveys and while customers who feel their water use is unexplainably high often opt for surveys, many customers are reluctant to avail themselves of a survey. Such surveys raise insurance and liability issues for site visits and any modifications made by surveyors which must be considered in program design. All other factors being equal, surveys that reduce demands are environmentally preferable over development of additional supplies or deliver of more water.

Cost Benefit Analysis Results: Based upon assumptions above the net present value of water savings from single family residential surveys is positive a \$73 per survey. Multi-family audits however show a positive net present value of \$162 per survey (assuming 10 units per survey visit).

Recommendation, Implementation and Schedule: Single family audits appear to be reasonably cost effective. It is recommended the District offer a program in FY-02 targeted at the top 10% of residential users. Multi-family surveys show an even higher net benefit to justify initiation of a program. A multi-family survey program will be developed focusing on multi-family units of 10 or more per site beginning in FY-02

2. *Enforcement of plumbing fixture efficiency standards and programs to retrofit less efficient fixtures.*

Program Description: These programs include two general components, 1) working with the land use jurisdiction to assure use of complying plumbing devices and, 2) distributing and/or installing retrofit kits including high quality low flow showerheads, toilet displacement devices, faucet aerators and toilet flappers to pre 1992 housing. Few agencies find it cost effective to fund or monitor land use jurisdiction's enforcement of plumbing standards. Given that the standards require manufacture of these low flow devices and that is all that is available on the legitimate retail market, such activity is deemed unnecessary. However, many agencies with conservation programs have initiated plumbing retrofit programs, either dropping retrofit kits at pre-1992 housing (hang and pray programs) or offering direct installation.

Economic and Noneconomic Factors: Offering or installing retrofit kits to pre-1992 homes has been a common program among water agencies with active conservation programs. Issues that must be considered are relatively high natural replacement levels for such fixtures as showerheads and recognition that replacement heads already meet the federal 2.5 gpm standard. Direct installation programs have a higher implementation rate than drop off or "hang and pray" distribution methods. However, direct installation programs are more costly and bring insurance and liability issues. It is estimated that these "hang and pray" types of retrofit programs provide average savings of 5.65 gpd per installation with a life expectancy of 10 years even assuming that just over 50% of the kits become installed. Costs are relatively low at \$13 per kit distributed. All other factors being equal, retrofit programs, which reduce demands, are environmentally preferable over development of additional supplies or delivery of more water.

Cost Benefit Analysis Results: Given the low costs of administering These projects, the "Hang and pray" retrofit programs result in a net present value of \$173 for every installation.

Recommendation, Implementation and Schedule: A simplified retrofit program offering leak detection dye tablets, a high quality low-flow showerhead, toilet flappers and faucet aerators will be recommended for implementation in FY-02, for pre-1992 housing only. If the District decides not to pursue a ULFT retrofit program, toilet dams should be considered as additions to the kits.

3. *Distribution System Water Audits Leak Detection and Repair*

Program Description: These audits compare total water sales against water production to make sure that unaccounted for water does not exceed 5%, the generally accepted industry standard for unaccounted water. Prior to 1984 the district loss rate was about 15 percent. Through an aggressive program of meter

retrofits and leak reduction program this figure has been brought to within industry standards.

Evaluation of Economic and Noneconomic Factors: Performance of prescreening audits comparing gross system production vs. sales is an accepted industry practice generally done on an annual basis. If results from this prescreening note excessive unaccounted water then a more detailed audit focusing on loss possibilities (system leakage, undermetering, illegal connections, fire flow water and system flushing etc.) are made. No significant social, environmental or technological factors are relevant for this activity.

Cost Benefit Analysis: As a system prescreening audit is current District practice, no cost-effectiveness evaluation was performed.

Recommendation, Implementation and Schedule: Continue with annual prescreening audits. Perform detailed audits where unaccounted water exceeds five percent.

4. Metering with Commodity Rates for All New Connections and Retrofit of Existing Connections

Program Description: The District currently meters all connections and a five-tier inclining block commodity rate structure.

5. Large Landscape Water Audits and Incentives

Program Description: These programs identify large landscapes over three acres (schools, parks, golf courses, cemeteries, etc.) offering surveys and development of evapotranspiration (ET_o) - based water budgets. Billing information is often correlated with the water budget. Irrigation system training is offered, often in a multilingual format. Financial incentives can be offered through ET_o based rate structures to encourage efficient use. Incentives can also be given for irrigation system retrofits and subsidies for irrigation training.

Evaluation of Economic and Noneconomic Factors: Large landscapes are often viewed as water conservation targets by the general public. Generally, however, and especially where dedicated meters exist, large landscapes are more efficiently managed than landscapes which are part of a mixed use setting. This is due to professional management and a direct correlation between the water bill and irrigation practices, where dedicated meters exist. This creates a financial incentive for conservation. Regardless, opportunity exists to improve irrigation efficiency. The California Irrigation Management Information System (CIMIS) operated by the Department of Water Resources provides real-time evapotranspiration and other climatic data available on the Internet to help manage irrigation demands.

While these programs implemented elsewhere have shown promising savings potential, achieving that potential often requires significant investment on the part of the customer which often is uneconomic. Many districts have found it cost-effective to subsidize a portion of irrigation system improvements, increasing the implementation rates of survey recommendations. This analysis assumes average direct and administrative costs are estimated at \$500 per survey and incentive payments average \$750 per survey for a total cost of \$1250 per survey. Savings average from 0.53 to 1.13 af/year per survey.

Cost Benefit Analysis Results: Based upon the costs and average savings above, large landscape surveys show a net positive present value of \$10 per survey. A larger value for the District could be achieved by lessening incentive payments to participants. However, that would likely lower implementation rates.

Recommendation, Implementation and Schedule: Given the small positive net present value for a large landscape audit program, it is recommended the District do a pre-screening of large landscape customers of three acres and above. In this pre-screening, the general efficiency and sophistication of the irrigation system can be assessed and the operators can be queried regarding their interest in a systematic survey and their interest and likelihood of being able to invest in efficiency improvements. If sufficient interest exists a pilot program targeting the largest and likely least efficient users could be initiated. Results of the pilot program would drive investment in a full scale program. Pre screening for this program would be initiated in FY-01 with a pilot program beginning in FY-02 if warranted.

While large landscape surveys are often not the most cost-effective conservation technique, they are generally cost-effective if survey recommendation results are implemented. Additionally, with their high public visibility, having a large landscape audit program can be helpful public relations. Given their relatively high rate of consumption, owner and operators of large landscapes are generally cooperative with such surveys as the money savings potential creates and economic incentive for participation. However, as noted above, the cost of implementing survey recommendations can be an impediment to achieving actual savings.

6. *Landscape Conservation Requirements for New and Existing Commercial and Industrial , Governmental and Multifamily Developments*

Program Description: State law requires local land use jurisdictions to enact and implement a landscape water conservation ordinance consistent with the State Model Landscape Ordinance, or one that uses a water budget approach to with water allowances for landscaping needs, or one that has rules and regulations that promote water conservation without tracking usage. Four land use jurisdictions have authority within the bounds of the Yucaipa Valley Water

District, The Counties of San Bernardino and Riverside and the cities of Yucaipa and Calimesa. Each of these jurisdictions maintains a landscape water conservation ordinance for new development. As such the responsibility for this demand management measure resides with the respective land use jurisdictions.

7. *Public Information*

Program Description: as noted above, the District has an ongoing public education program.

8. *School Education*

Program Description: These programs generally consist of provision of teacher training materials and teacher inservice training to elementary (4th grade) and above. Materials consist of general information regarding the water cycle, information on California's water system, groundwater resources, drinking water quality and the role of individuals in water conservation and water quality protection. The intent of the materials and in-service training is to educate educators about California's water system, a conservation ethic and to have those teachers incorporate this information into the curriculum for their classrooms. A populace with basic education on water issues assists in resolving water supply and quality problems. Some districts develop their own materials and provide in-classroom instruction. Others utilize materials from the nonprofit Water Education Foundation and their in-service teacher training programs, whose materials are consistent with the standards of California's Framework for Science and History/Social Science Education. A variety of programs are available from the Foundation along with in-service training for those programs.

Evaluation of Economic and Noneconomic Factors: Beginning a school education program will require nominal investment from the District. This investment, however provides dividends in terms of a more educated customer base and improves community relations.

Cost-Benefit Analysis: Water savings data do not exist for education programs. Consequently, no cost benefit analysis is possible. However, education programs complement other conservation activities and are believed to lower overall consumption.

Recommendation, Implementation and Schedule: The District will begin a program in FY-01 dedicating \$2,500 to a secondary school program, grades 4-6. Utilizing program materials from the Water Education Foundation, these funds would allow provision of materials and in-service training for up to 125 teachers within the District.

9. Commercial and Industrial Water Conservation

Program Description: These programs consist of identifying commercial and industrial accounts and offering surveys and/or incentives for conservation where the surveys indicate an opportunity for conservation.

Economic and Noneconomic Factors: The District service area historically has been a residential retirement community with only one significant industrial customer, and egg processing plant. Recent residential and supporting commercial growth is changing the customer makeup. However, since this commercial growth is occurring subsequent to the 1992 Plumbing Code amendments, it is deemed to be relatively efficient. Commercial and industrial audits in other regions have found most of the savings opportunity in the replacement of high flow toilets, as these toilets receive relatively high usage rates. The literature reveals that surveys for this sector have resulted in about 1.27AF of savings per year against an average cost of \$1,200 per survey. Industrial surveys are more complicated than commercial surveys and thus survey costs for the District are estimated to be about \$400. Incentive costs (mostly ULFT rebates) are estimated at \$500 per survey at @\$75 per toilet for the District.

Cost Benefit Analysis: Given the lack of significant commercial and industrial uses prior to 1992, no analysis was performed.

Recommendation, Implementation and Schedule: As the District develops, new development will both be subject to landscaping water use standards of the land use jurisdictions and the 1992 plumbing code. As such, commercial/industrial retrofit opportunities are largely absent and a program is not recommended.

10. New Commercial and Industrial Water Use Review

Program Description: These programs involve reviews of potential water consumption and conservation potential during the development review process.

Economic and Noneconomic Factors: Given the specialized nature of industrial water use and a high cost to assess process water use, and gains made by the 1992 Plumbing code amendments which cover conventional uses, few water agencies invest in such programs. This action has been dropped from the California Urban Water Conservation Council's list of Best Management Practices.

Cost-Benefit Analysis: No data exists for water savings for this demand management measure; consequently no cost benefit analysis was performed.

Recommendation, Implementation and Schedule: No program is recommended.

11. Conservation Pricing for Water Service and Conservation Pricing for Sewer Service, Where the Urban Water Supplier Also Provides Sewer Service.

Program Description: As noted above in section 10.2, the district practices conservation pricing for its water service with a commodity rate structure which includes five tiers. Sewer service is based upon a flat service charge for residential customers and charges based upon equivalent service units for commercial and industrial customers. With an incentive to conserve on the water rate, it is deemed unnecessary to attempt to construct a commodity rate structure for sewer service. Additionally, the accuracy of such rate structures are questionable as they generally assess charges based upon winter season demands which vary depending on hydrology of a given year and landscaping demands.

12. Landscape Water Conservation for New and Existing Single Family Homes

Program Description: These programs generally involve providing information and incentives for installation of water efficient and xeriscape landscapes.

Economic and Noneconomic Factors: These programs overlap with implementation of landscape ordinances for new construction as required by state law. However, in many new developments, only front yard landscaping is provided, leaving rear yard landscaping to the discretion of the homeowner. Opportunity exists to provide information to new homeowners and to work with developers to provide xeriscape landscape options.

Cost Benefit Analysis: No published data for water savings exist on such programs; no analysis was performed. However, implementation costs for these programs can be nominal and attractive conservation opportunity exists.

Recommendation, Implementation and Schedule: Beginning in FY-01 the District will meet with major developers in the region to encourage their offering xeriscape options for front landscaping. Additionally, the District will work with developers to provide xeriscape landscaping information materials to new homeowners at move-in.

13. Water Waste Prohibitions

Program Description: The District has a water waste prohibition ordinance in place.

14. Water Conservation Coordinator

Program Description: This action consists of designating a water conservation coordinator among the staff of the District or hiring a new person for the function. The person oversees and coordinates the District's conservation programs.

Economic and Noneconomic Factors: Having a designated coordinator helps improve the effectiveness of a water agency's conservation efforts. Depending upon the scope of the program and size of the District, along with other staffing demands, these duties can be a part or full time responsibility.

Cost Benefit Analysis: This action cannot be analyzed for cost-effectiveness

Recommendation, Implementation and Schedule: The District will review the overall conservation program as recommended herein and either designate an existing staff member or hire a new staff member for the function in FY-01.

15. Financial Incentives to Encourage Water Conservation

Program Description: Financial incentives are often provided by water agencies to reduce demand where cost effective. They are usually used in the context of other demand management measures where savings have been identified.

Economic and Noneconomic Factors: The justification for financial incentives is made via specific analysis of other demand management measures as described in this chapter.

Cost Benefit Analysis: See analyses for other program measures in this chapter

Recommendation, Implementation and Schedule: See other program measures in this chapter.

16. Ultra Low Flush Toilet Replacement

Program Description: This program consists of measures to replace older 7gal/flush and 3.5 gal/flush toilets with 1.6 gal/flush toilets. Agencies have approached this program generally in three ways: 1) requiring a retrofit on resale ordinance where homes are required to retrofit to low flow fixtures upon a resale; 2) Direct distribution of toilets to local community groups who oversee installation; and, 3) Rebate programs where vouchers or rebates are given for toilet replacement.

Economic and Noneconomic Factors: ULFT replacement programs have generally been the most successful of demand management measures. A number of issues exist, however. Program cost-effectiveness varies by program design. Retrofit on resale ordinances are very inexpensive from the District's

perspective as costs are shifted to the home repurchasers/sellers. These ordinances tend to be very unpopular with the real estate community and home sellers, however, as it can impede a sale due to timing and often requires replacing floor coverings around the toilet. Direct distribution programs have the highest cost-effectiveness but don't necessarily reach all potential customers. Rebate programs are generally effective but have a higher incidence of "free ridership" where some customers would be replacing a toilet anyway and receive the rebate. Regardless, savings for these programs have been shown to be 35-45 gal. per replacement per day. Higher savings are found in higher density housing and commercial/industrial settings. Savings also persist as toilet life is generally about 25 years. Implementation costs for simple rebate programs, the most popular average about \$100 per unit.

It should be recognized that given the revised plumbing code, allowing for only 1.6 gal/flush toilet models to be purchased, that natural turnover, usually in the range of 3-4% per year will eventually replace all of the older, high water use models. ULFT incentive programs accelerate these savings and as such can help defer or eliminate other capital investment needs.

Customer acceptance issues often are raised with these programs. Complaints about the function of early models of ULFTs, bowl cleanliness, double flushing, etc. have been raised as reasons to avoid such programs. With the experience manufacturers have gained in recent years however, such complaints have diminished and data shows that these toilets work as well or better than the older models. Recent federal legislation intending to repeal the low-flow plumbing standards in part due to anecdotal complaints of poor performance of ULFTs was defeated when supporters could not produce customer confidence data and opponents showed empirical data indicating consumer satisfaction was high.

Cost Benefit Analysis: Two potential ULFT retrofit programs were analyzed. A rebate program assuming a rebate of \$75 and administrative costs of \$25 per toilet installed was assumed in the first program. To account for the natural replacement factor and free ridership, savings attributed to the program were discounted 40% per toilet rebate, resulting in a net unit savings of 24 gallon per rebate per day. Program life was set at 15 years, a conservative assumption given toilets last about 25 years. In the second analysis a direct distribution program was assumed, which lowers the natural replacement and free ridership factor to 20 percent.

Recommendation, Implementation and Schedule: Neither program as posed above produced a positive net present value. The rebate program resulted in a -\$6 NPV and the direct distribution program -\$33. Sensitivity analysis was done lengthening the program life and savings attributed to the program but that did not improve the NPV.

Therefore, this program is not recommended for implementation.

**YUCAIPA VALLEY WATER DISTRICT
2000 URBAN WATER MANAGEMENT PLAN
AND
WATER SHORTAGE CONTINGENCY PLAN**

**SECTION 4
WATER SHORTAGE CONTINGENCY PLAN**

4.0 INTRODUCTION

Section 10632 et. Seq. of the California Water Code requires the preparation and maintenance of a Water Shortage Contingency Analysis including the following elements:

- a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.
- b) An estimate of the minimum water supply available during each of the next three water years based upon the driest three-year historic sequence for the agency's water supply.
- c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption in of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.
- d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to prohibiting the use of potable water for street cleaning.
- e) Consumption reduction methods in the most restrictive stages. Each water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in supply.
- f) Penalties or charges for excessive use, where applicable.
- g) An analysis of the impact of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.
- h) A draft water shortage contingency resolution or ordinance.

- i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

The Yucaipa Valley Water District adopted its current Water Shortage Contingency Plan January 30, 1992. This plan builds on that original plan, the District's experience in implementation during the 1987-1992 drought and changed requirements under the law. It also is a supplement to the District's 2000 Urban Water Management Plan.

4.1 THREE-YEAR MINIMUM SUPPLY

The District currently relies on groundwater to provide over 95% of its supply needs. Given the large capacity of the basin, current storage volumes, and current and near-term well capacity, in the near term, the District should be able to meet full service demands in a hydrologic shortage regardless of the hydrology. Therefore, the driest three year sequence on record is not immediately relevant. Some curtailments due to current summertime peak capacity limitations, rather than hydrologic limitations could occur, however.

When State Project water and access to other surface waters come on line in 2002 the system will be able to maintain nearly 100% reliability over any three-year dry cycle sequence. Aggressive recycled water development will also underpin overall supply reliability and lower demands on inconsistent imported water resources. Ultimately if in total, surface water supplies become unacceptably unreliable, the District can develop additional well capacity to match total overall demands, less recycled water availability. In this way, droughts can be managed through conjunctive use of the groundwater basin: drawing down the basin in hydrologic shortages and recharging the basin during supply availability surpluses in wetter years.

4.2 DROUGHT MANAGEMENT

Water shortages can be triggered by a hydrologic limitation in supply, e.g. a prolonged period of below normal precipitation and runoff, limitations or failure of supply and treatment infrastructure, or both. Hydrologic or drought limitations tend to develop and abate more slowly whereas infrastructure failure tends to happen quickly and relatively unpredictably. Additionally, California's imported water supply system is vulnerable to unpredictable restrictions on water storage and delivery due to conflicts with sensitive aquatic species.

California's climatic regime is one typified by distinct seasonal patterns of precipitation and cyclical patterns of a number of years of above or below average precipitation. Therefore, water systems and management mechanisms need to be able to cope with these variations. The Urban Water Management Planning Act requires water agencies to plan for varying levels of temporary or prolonged shortages of up to 50 percent of normal supplies. This plan segregates water shortage scenarios into five stages, outlining progressively more restrictive requirements on water users as shortages become more pronounced.

Customers and the general public will be kept informed of water shortage management actions of the district through direct mail as necessary combined with water billings and at all times through the District's website. A link to the California Department of Water Resources website location for water supply information will be provided on the site (http://cded.water.ca.gov/water_supply.html)

4.3 CATASTROPHIC EVENTS

Over the past ten years the District has been upgrading its supply infrastructure to better meet the needs of its customers. Additionally, the age of the District's infrastructure is relatively young with only three percent of the pipeline inventory over 35 years old. However, the District is in a very active seismological area and is also subject to power outages that can limit production from wells and the District's planned treatment plant for imported water. The District has available diesel back-up power generation capability for its well system and treatment plant. Backup power units are portable and can be moved from well site to well site depending upon the location and extent of outage.

In addition to being able to invoke the water shortage contingency actions as stated herein, the District in 1998 adopted a Major Disaster Plan and Alerting Procedures. This plan deals with non-drought related water shortages. This plan addresses shortages that might result from earthquakes, power outages, pipeline ruptures, terrorism threats and water quality limitations/contamination. It outlines the responsibilities of the District's designated emergency response personnel, alerting procedures, alternate headquarters, communications, transportation and relationships with regional and state emergency response officials. District water supply facilities are operated through an independent and reliable radio and telemetry network designed to operate under emergency conditions.

In addition to in-house emergency plans and procedures, the District is a member of the Yucaipa Valley Emergency Services Committee. Other member include the City of Yucaipa Fire and Police departments, County Sheriff's Department and the Yucaipa-Calimesa Joint Unified School District.

4.4 WATER SHORTAGE RESPONSE STAGES, PROHIBITIONS AND PENALTIES

This plan provides for five levels of progressively more aggressive water demand reduction requirements as displayed in **Table 4-1**.

Table 4-1
Water Shortage Response Stages

Stage	Type Program	Water Use Reduction	Overall Reduction
I	Voluntary	10% from selected areas	--
II	Voluntary	Up to 15% district wide	15%
III	Mandatory	Up to 30% district wide	30%
IV	Mandatory	Up to 40% district wide	40%
V	Mandatory	Up to 50% district wide	50%

Drought events which trigger these stages will likely be those affecting imported water sources provided the Yucaipa groundwater basin continues to be managed in a safe yield condition over the long term. As such, the amount of imported water shortage imposed by wholesalers to the District, San Bernardino Valley Water District and the San Geronio Pass Water Agency will in most instances drive the required stage. Additionally, to the extent well capacity exists, the Yucaipa basin can be temporarily exercised beyond its long term safe yield of about 9,270 acre feet per year (Mann, Todd, 1990) to compensate for imported water shortages.

The shortage response stages may also be invoked during a non-drought water emergency to handle short-term events such as earthquake damage, pipeline ruptures and water quality problems.

The stages were developed based upon recognition of the need for equity and recognition of the priority for health and safety issues during the extreme shortage conditions. Through the water allocation system they also recognize the variation in water use within a customer class. The system attempts to recognize prior conservation by allocating set amounts per use with partial modification of allocations based upon prior use.

While certain water use prohibitions apply at each stage, in stages III-V the plan balances between achieving savings through those prohibitions and providing an allocation for users to apply as they deem appropriate, consistent with obeying the

prohibitions. This allows the individual consumer to exercise independent judgement as to how best to use their allocation.

The District Board of Directors will determine the appropriate stage of implementation, although they may delegate the authority to implement Stage I or II to the General Manager. Triggers for consideration of invoking a specific stage of the Contingency Plan will be notification from the District's water wholesalers, the San Bernardino Valley Water District and the San Gorgonio Pass Water Agency, collectively or individually, that those districts intend to curtail imported water deliveries to YVWD. For example, where imported water requested deliveries are expected to be curtailed by 10 percent a Stage I action will be considered. Where deliveries are expected to be curtailed by up to 15, 30, 40 and 50 percent, respective shortage stages will be considered (Stages II-V). Inasmuch as imported supplies will make up only a portion of District supplies, the District will determine the total supply available, the likely duration of the imported water shortage and invoke the appropriate stage to reduce overall demands to available supply. As shortage conditions ease, the District will consider relaxing the shortage stages based upon notification from wholesalers that supply conditions are improving.

Use restrictions as follows below, other than water waste ordinance provisions, shall not apply to the use of recycled water.

4.4.1 Stage I Actions – up to 10% Shortage

The District has significant geographic variation in its water consumption, particularly in residential areas, due to land use and a variety of pressure zones. Under Stage I the relatively high water consuming areas would be asked to implement the following measures on a voluntary basis.

Prohibitions

- Landscape watering on an odd-even day basis based upon address number and avoiding irrigation between 0800 and 1700 hours.
- Elimination of hosing of hardscape surfaces, except where health and safety needs dictate.
- Usage of buckets and automatic hose shut off devices for car washing and outside cleaning activities.
- Repair water leaks and adjust sprinklers to eliminate over-spray.

Other Activities

- The District shall notify customers in the target areas of the shortage and indicate requested curtailments of use. Such notification shall provide avenues of additional information assisting customers in achieving requested conservation.

4.4.2 Stage II Actions – up to 15% Shortage

Prohibitions

- Stage II Actions would extend the voluntary requests under Stage 1 district-wide. Additionally, new meter sales for land development would be restricted, allowing meter sales only to property owners of presently existing parcels

Other Actions

- All customers would be notified of the shortage and requested curtailments of use. Such notification shall provide avenues of additional information assisting customers in achieving requested conservation.
- Initiate media campaign to educate the District customers of conservation needs

4.4.3 Stage III Actions – up to 30% Shortage

Prohibitions

- During Stage III the voluntary action requests from Stages I and II become mandatory as a water emergency would be declared by the District's Board of Directors pursuant section 350 of the water code.
- Issuance of construction water meters would cease for the duration of the Stage III event and meters would be installed for new accounts only where the building permit was issued prior to the declaration of the water shortage emergency.
- Mandatory use prohibitions will be enforced through water patrol personnel who may issue a warning notice for a first offense, provide for a water bill surcharge of \$25 for a second offense, \$75 for a third offense and shut-off of water service for a fourth offense. For a fourth offense normal water use initiation fees would apply for restoration of the service.

Other Actions

- In addition to the prohibited actions, the District would establish average monthly allotments for each connection based upon a base period selected by the District as follows:
 1. Each single family residential connection shall receive no more than 14 hcf per month plus 20% of the average annual usage in excess of 240 hcf.

2. Each multifamily residential unit shall receive no more than 9 hcf per month plus 40% of the average annual usage in excess of 145 hcf.
3. Each commercial, industrial and governmental connection shall receive no more than 80% of its average monthly usage.
4. Each landscaping connection (dedicated irrigation meters) shall receive 40% of the average monthly usage except those accounts determined by District staff to have met applicable landscape design criteria under city or county ordinance which shall receive 80% of average monthly usage.
5. Each recreational connection shall be allotted 70% of the average monthly usage.
6. Exceeding the usage rates above are subject to 100% surcharge of the applicable rate for each use.

4.4.4 Stage IV Actions – up to 40% Shortage

Prohibitions

- All prohibitions from Stage III would be in effect

Other Actions

- In addition to the prohibited actions, the District would establish average monthly allotments for each connection based upon a base period selected by the District as follows:
 1. Each single family residential connection shall receive no more than 14 hcf per month plus 10% of the average annual usage in excess of 240 hcf.
 2. Each multifamily residential unit shall receive no more than 9 hcf per month plus 20% of the average annual usage in excess of 145 hcf.
 3. Each commercial, industrial and governmental connection shall receive no more than 70% of the average monthly usage.
 4. Each landscaping connection (dedicated irrigation meters) shall receive 20% of the average monthly usage except those accounts determined by District staff to have met applicable landscape design criteria under city and county ordinance which shall receive 70% of average monthly usage.

5. Each recreational connection shall be allotted 50% of average monthly usage.
6. Exceeding the usage rates above are subject to 200% surcharge of the applicable rate for each use.

4.4.5 Stage V Actions – up to a 50% shortage

Prohibited Actions

- All prohibited actions in Stage IV would be in force except as noted below.
- No meters would be installed for new accounts for the duration of the Stage V emergency.

Other Actions

- In addition to the prohibited actions, the District would establish average monthly allotments for each connection based upon a base period selected by the District as follows:
 1. Each single family residential connection shall receive no more than 10 hcf per month.
 2. Each multifamily residential unit including mobile homes shall receive no more than 6 hcf per month.
 3. Each commercial, industrial and governmental connection shall receive no more than 65% of the average monthly usage.
 4. Each landscaping connection (dedicated irrigation meters) shall receive no allotment except those accounts determined by District staff to have met applicable landscape design criteria under city and county ordinance, which shall receive 15% of average monthly usage.
 5. Each recreational connection shall receive no water. In the case of irrigation of golf courses, irrigation shall be limited to tees and greens only.
 6. Exceeding the usage rates above are subject to 500% surcharge of the applicable rate for each use.

4.5 ALLOTMENT APPEALS PROCEDURES

1. Any person who wishes to appeal their customer classification or allotment shall do so in writing using forms provided by the District.

2. Appeals will be reviewed by the Assistant General Manager and site visits scheduled if required.
3. A condition of approval shall be that all applicable plumbing fixtures or irrigation systems be replaced or modified for maximum water conservation prior to considering and appeal.
4. Appeals may be granted for the following:
 - a. Proof of substantial medical requirements
 - b. Residential connections with more than four residents in a single family household or four residents at a multifamily household may be awarded an additional 2 HCF per person. During a Stage V shortage, a census will be conducted to determine the actual number of residents per dwelling unit. Water may be granted to additional permanent residents – defined as five days a week, nine months per year.
 - c. Commercial/Industrial accounts may appeal for increased allocations where it can be shown that allocations would otherwise cause unemployment, decreased production or mechanical equipment damage, after confirmation by a District water auditor that the account has instituted all applicable water efficiency improvements.
 - d. Nonagricultural customers can appeal for additional water for livestock.
 - e. Government agencies (parks, school, county, etc.) may have their separate allotments for each meter combined into one “agency” allotment.
5. In the event an appeal for additional allotment is requested for irrigation of trees or vegetation in residential categories or for any agricultural use, the District may use the services of a qualified consultant in determining the validity of the request.
6. The District General Manager shall approve or deny appeals.
7. If the District General Manager and the applicant are unable to reach accord, then the appeal shall be heard by the Water District Board of Directors, who will make the final determination.
8. All appeals shall be reported monthly to the Board of Directors

4.6 REVENUE AND EXPENDITURE IMPACTS

It is difficult to precisely gauge the revenue and expenditure impacts of implementation of the water shortage contingency plan. As the plan provides for both prohibitions, water use allotments and penalty pricing for exceeding allotments, the ultimate revenue impacts will be based upon a mix of responses to these requirements. Additionally, weather can be a factor as well. Customers may find it more difficult to meet allocations during hot weather where a desire to maintain landscaping uses at a higher level exists and therefore more customers may find themselves paying penalty rates.

For planning purposes it is assumed that District Conservation goals are met at each stage and that revenue losses are proportional to the commodity rate revenue not received, exclusive of penalty rates, plus revenue losses due to particular prohibitions.

It is also assumed that additional District expenses for implementing the plan would be offset by excess use penalties. Potential revenue losses are listed in table 4-2.

Table 4-2
Annual Potential Revenue Losses by Plan Stage
(based on 2001 Revenue and Expenses)

Revenue Source	Stage I ¹	Stage II	Stage III	Stage IV	Stage V
Domestic Water Sales	\$112,500	\$337,500	\$675,000	\$900,000	\$1,125,000
Construction Water Sales	\$0	\$20,000	\$50,000	\$50,000	\$50,000
Meter Sales	\$0	\$20,000	\$25,000	\$25,000	\$32,500
Water Sales Losses	\$112,500	\$377,500	\$750,000	\$975,000	\$1,207,500
Less Production Cost Reductions	(\$59,700)	(\$179,300)	(\$358,500)	(\$478,000)	(\$597,500)
Net Water Revenue Reduction	\$52,800	\$198,200	\$391,500	\$497,000	\$610,000
Percent Total Water Revenue Loss	1.0%	4.1%	8.1%	10.3%	12.6%

4.7 MEASURES TO OVERCOME IMPACTS

Based upon the District's current fiscal situation, Impacts during stages I and II could be absorbed by District reserves without requiring a rate increase provided the shortage

¹ Stage 1 assumes 5% drop in sales; all other stages at maximum shortage, e.g., Stage IV=40%

condition did not persist for more than two years. Impacts beyond two years would need to be reassessed. Stages III and beyond could require reductions in the pay-as-you go portion of the District's Capital Improvement Program. Additionally, deferring non-critical maintenance items and filling some personnel vacancies would be considered. Should revenue loss impacts begin to affect essential District operations, a temporary emergency surcharge on the base water rate could be imposed to fund District operations.

4.8 REDUCTION MEASURE MEASURING MECHANISM

As the districts accounts are fully metered, accounting for actual consumption will be afforded for each customer against any allocation. Well production records and imported water purchases will also be tallied to discern overall production amounts versus conservation goals. Collectively these data will be analyzed to assess any need for alterations to the Shortage Response Plan.

4.9 WATER SHORTAGE CONTINGENCY RESOLUTION

Resolution No. – 2000

Resolution of the Board of Directors of the Yucaipa
Valley Water District, San Bernardino and Riverside Counties, California
Adopting the District's Water Shortage Contingency Plan

WHEREAS, the California Legislature has enacted the Urban Water Management Planning Act, California Water Code Sections 10610 through 10656 requiring every municipal water provider directly or indirectly providing water to more than 3000 customers or supplying more than 3000 acre feet to develop an Urban Water Management Plan; and

WHEREAS, Section 10632 of the California Water Code requires preparation of a urban water shortage contingency analysis as part of the Urban Water Management Plan adopted by resolution or ordinance of the water provider; and

WHEREAS, Section 10621 of the California Water Code requires revision of the Urban Water Management plan every five years, in years ending in five and zero; and

WHEREAS, Section 10644 (a) of the California Water Code requires an urban water supplier to file its plan with the State Department of Water Resources no later than 30 days after its adoption; and

WHEREAS, the Yucaipa Valley Water District is an urban supplier of water providing water to more than 3000 customers, and has, therefore prepared and circulated for public review its Draft Urban Water Management Plan in compliance with Chapter 3, Article 3 of the Urban Water Management Planning Act and a properly noticed public hearing on said draft plan was held by the District on December 20, 2000 and a final plan prepared;

NOW, THEREFORE, BE IT RESOLVED by the Board of Directors of the Yucaipa Valley Water District as follows:

1. The Water Shortage Contingency Plan is hereby adopted and ordered filed with the Yucaipa Valley Water District.
2. The General Manager is hereby authorized and directed to file this Plan with the California Department of Water Resources.
3. The General Manager is hereby authorized to invoke Stages I and II of the Plan and recommend to the Board the declaration of a Water Shortage Emergency under California Water Code Section 350 et. Seq. whereby

the Board may authorize implementation of Stages III-V of the Water Shortage Contingency Plan.

4. The General Manager shall recommend to the Board of Directors regarding additional procedures, rules and regulations to carry out effective and equitable allocation of waters resources during a water shortage.

ADOPTED this 20th day of December 2000.

President of the Yucaipa Valley
Water District and the Board of Directors
Thereof

ATTEST:

Secretary of the Yucaipa Valley Water District
And the Board of Directors thereof

Yucaipa Water District Shortage Appeals Form

<p>Date: _____</p> <p>Name: _____</p> <p>Address: _____ _____ _____</p> <p>Phone: _____</p> <p>Account Number: _____</p> <p>Name on Account if different from Above: _____</p> <p>Relationship to Account Holder : _____</p> <p>Signature: _____ Under the penalty of perjury, I certify that the above information is true and correct</p>	<p style="text-align: center;"><u>Change in Classification Request</u></p> <p>Current Customer Classification²: _____</p> <p>Requested Reclassification (if Applicable) _____</p> <p>Reason(s) supporting classification change request: _____ _____ _____</p> <p style="text-align: center;"><u>Change in Water Allocation Request</u></p> <p>Reason(s) for additional allocation: _____ _____ _____ _____</p>
<p>District Use Only</p> <p>Action: _____ by: _____ date: _____</p> <p style="text-align: center;"><u>Appeal to Board of Directors</u></p> <p>Action: _____</p> <p>Date: _____</p>	

² e.g., single family residential, multi-family residential, commercial, industrial, recreation

**YUCAIPA VALLEY WATER DISTRICT
2000 URBAN WATER MANAGEMENT PLAN
AND
WATER SHORTAGE CONTINGENCY PLAN**

**SECTION 5.0
REFERENCES**

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2. California Department of Water Resources, Cost Effectiveness Tool Version 1.1, 1997.
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7. San Bernardino Valley Municipal Water District, Regional Water Facilities Master Plan, 1995
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